

Superficial brachial artery continuing as the common interosseous artery

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journal or publication title	Journal of Anatomy
volume	191
number	1
page range	155-157
year	1997-01-01
URL	http://hdl.handle.net/2297/3549

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A rare case: Superficial brachial artery continuing as the common interosseous artery

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Superficial artery of the arm having a course anterior to that of the median nerve is found at incidence of about 13%, and it continues as the radial artery twice as frequently as it continues as the ulnar artery, although it less frequently continues as both arteries (Bergman et al., 1988). We report a rare case that we encountered in the course of routine anatomical dissection in which the superficial brachial artery continued as the common interosseous artery only and the deep brachial artery continued as the radial and superficial ulnar arteries in the cubital fossa.

This anomaly (Fig. 1) was observed during routine dissection of the left arm of a 76-year-old Japanese woman who died of cancer of the colon. Proximal to the loop of the lateral and medial pectoral nerves, the axillary artery (7 mm in diameter) branched to give rise to the thoracoacromial artery before passing distally to give rise to the posterior circumflex humeral and subscapular arteries. Continuing distally as the brachial artery, it gave rise to the profunda brachii artery 1 cm proximal to the lower border of pectoralis major. Now 5 mm in diameter, it divided 1 cm distal to the lower border of pectoralis major into superficial and deep brachial arteries. The superficial brachial artery (3 mm in diameter) crossed over the confluence of the medial and lateral roots of the median nerve, descending ventral and lateral to the median nerve, and becoming situated progressively further behind the nerve. It then continued as the common interosseous artery in the cubital fossa. The common interosseous artery branched off the recurrent ulnar, median, and posterior interosseous arteries, and muscle branches, then continued as the anterior interosseous artery.

The deep brachial artery (4 mm in diameter) passed from dorsal to medial to the median nerve, progressively spiraling ventral to it at the distal third of the brachium. It split into the radial and superficial ulnar arteries. The radial artery (4 mm in diameter) gave off the recurrent radial artery and muscle branches, and had a normal course in the forearm. The superficial ulnar artery (4 mm in diameter) had no branches in the forearm, descending superficial to the pronator teres and flexor muscles. It was located lateral to the flexor carpi ulnaris in the wrist, and met the ulnar nerve, which showed a normal course. In the hand it anastomosed with the branch of the radial artery, completing the superficial palmar arch. The anatomy of the deep palmar arch was unclear. No anastomoses were noted between the interosseous arteries and the radial or superficial ulnar arteries.

Additionally, the site at which the medial root of the median nerve was joined by the lateral root of the median nerve was about 1.5 cm distal to the lower border of the

pectoralis major, thus the connection site was much lower than that normally found.

The double branching pattern of the brachial artery has been reported in the past (Sharpey et al., 1878; Müller 1903; Adachi 1928; McCormack et al., 1953; Jurjus et al., 1986; Rodríguez-Baeza et al, 1995); in this pattern the superficial brachial artery divided into the radial and ulnar or sometimes superficial ulnar arteries, and the deep brachial artery continued as the common interosseous artery. The present case is similar to that described above at first sight, but in fact is very different from it. In our case the superficial brachial artery in the upper part of the brachium became the deep brachial artery or the common interosseous artery in the cubital fossa, whereas the deep brachial artery in the upper part of the brachium became the superficial brachial artery in the lower part of the brachium and divided into the radial and superficial ulnar arteries: the double brachial arteries descended in a spiral curve around the median nerve. To the best of our knowledge, this anomaly has not been described previously.

Manners-Smith (1910, 1911) described the possible process of the formation of the limb arteries of primates and the variations of the human limb arteries based upon the fetal vascular network demonstrated by Müller (1903). According to the discussion by Manners-Smith, in the embryonic state the deep brachial artery (referred to as the brachial artery in the adult) anastomoses with the superficial brachial artery near or at the elbow. At the anastomotic part the deep brachial artery divides into the radial and interosseous arteries, and the superficial brachial artery branches off the volar superficial antebrachial artery which continues as the superficial ulnar artery. If the deep brachial artery is continuous with the radial and volar superficial antebrachial arteries at the anastomotic part, the superficial brachial artery continues as the interosseous artery at that part, and these arteries then remain in the adult, it is possible that the present variation in which the two brachial arteries spiral around the median nerve could have been formed. It seems difficult, however, to clarify the process of morphogenetic changes of the arteries at the anastomotic part without the observation by electron microscopy of the fetal vascular network.

Since the superficial ulnar artery passes superficial to the flexor muscles like the superficial veins, clinicians should take care neither to give an injection into the artery instead of the vein, nor to ligate the artery instead of the vein (Hazlett, 1949; Thoma and Young, 1992).

ACKNOWLEDGEMENTS

We thank Mr Y. Shiraishi for drawing the illustration, Mr T. Nakamura for technical assistance and Ms I. Koizumi for secretarial assistance.

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Figure Legends

Fig. 1. a) A close-up photograph of the left upper arm. Arrows indicate the superficial brachial artery continuing as the common interosseous artery. Arrow heads indicate the deep brachial, radial, and superficial ulnar arteries. The pronator teres is reflected back. The flexor muscles have been partly removed. b) Drawing showing the structures of the left arm. The asterisks in both the photograph and the drawing are the site of the connection between the medial and lateral roots of the median nerve.

Abbreviations: AA, axillary artery; AIA, anterior interosseous artery; BA, brachial artery; BB, biceps brachii; BR, brachioradialis; C, cervical nerve; CB, coracobrachialis; CIA, common interosseous artery; DBA, deep brachial artery; FCU, flexor carpi ulnaris; FDP, flexor digitorum profundus; FDS, flexor digitorum superficialis; LD, latissimus dorsi; LR, lateral root of the median nerve; MA, median artery; MN, median nerve; MR, medial root of the median nerve; PBA, profunda brachii artery; PIA, posterior interosseous artery; PM, pectoralis major; PT, pronator teres; PQ, pronator quadratus; RA, radial artery; SBA, superficial brachial artery; SPA, superficial palmar arch; SUA, superficial ulnar artery; T, thoracic nerve; TAA, thoracoacromial artery; UN, ulnar nerve.

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